

## PROJECT PROFILE

### ENVIRONMENTAL TECHNOLOGY



# Solar Aquatics™ System(SAS) for Wastewater Purification

*"In continuation of its long history of leadership in the environmental engineering field, Proctor & Redfern is committed to the development of the Solar Aquatics System for sewage and septage treatment applications in the province of Ontario. This environmentally friendly technology is particularly appropriate for small communities with septic tanks or for remote tourist facilities."*

Frank C. Moir  
Executive Vice-President  
Proctor & Redfern Ltd., Don Mills, Ontario



Solar Aquatics™ System Demonstration.

## THE COMPANY

Driven by a corporate philosophy to provide preeminent professional consulting services to meet the needs of clients, Proctor & Redfern is one of Canada's best known engineering firms. Proctor & Redfern is a full service consulting firm, recognized by clients for sound technical and management performance. The firm is wholly owned by its staff and committed to upholding its standards of excellence.

## THE CHALLENGE

There are increasing consumption and pollution stresses on Ontario's water resources. A need has been identified for an improved wastewater treatment system that would be more cost effective, decentralized (treatment at the source) and ecologically based. These issues led Proctor & Redfern to construct a Bio-Regenerative Wastewater Treatment System, known as the Solar Aquatics™ System (SAS), at the Ontario Science Centre (OSC). This model demonstration facility is designed to educate the public, validate the technology and create commercial opportunities for Solar Aquatics™.

## TECHNOLOGY DESCRIPTION

The SAS uses diverse, self-adaptive aquatic environments to treat wastewater. Plants, snails, bacteria and other microorganisms metabolize or bind up wastewater contaminants in ten aerated translucent tanks and an anoxic marsh. Chemical flocculation, precipitation, neutralization and disinfection are avoided and mechanical simplicity is emphasized. Proper temperature, humidity and light conditions are maintained in a greenhouse for year-round treatment. Long retention times produce fewer and more stabilized biosolids, as well as providing a buffer against accidental toxic discharges to sensitive receiving waters. Proctor & Redfern has acquired the Ontario rights for the Solar Aquatics™ technology from the patent owners, Ecological Engineering Associates, of Massachusetts. The demonstration facility at the Ontario Science Centre will handle 6,800 L/day of sewage, or approximately 10 per cent of the Centre's total effluent.

## RESULTS

Permitted SAS facilities are in operation in several states in the USA., as well as in Nova Scotia and in Mexico. A one-year monitoring program, developed in co-operation with the MOEE, is underway to establish SAS as a proven and viable technology. Early results show impressive suspended solids, BOD (biological oxygen demand) and nitrogen removal (all below 10 mg/L). Research is underway to improve the phosphorus removal to better than 1 mg/L.

## TECHNOLOGY OPPORTUNITIES

The SAS is ideally suited to communities seeking a sewage treatment facility with the following qualities:

- \* sub-surface discharge of the effluent to a nitrate-sensitive receiver;
- \* seasonal septage or boat wastes;

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- \* treatment capacities ranging from 75 to 1800 m<sup>3</sup>/day (serving 300 to 7000 people);
- \* proven tourist attraction, educational facility and winter refuge;
- \* potential for seasonal irrigation, habitat restoration and water reuse;
- \* green image and value-added features that facilitate community acceptance;
- \* cost competitive with conventional concrete/chemical based systems.

Surface discharge requires chemical polishing for phosphorus removal. Research for a less chemical dependent process is underway at Proctor & Redfern.

## **PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION**

The demonstration of this technology was partially funded by the Ontario Ministry of Environment and Energy and the Ontario Realty Corporation.

Industrial companies located in Ontario may participate in ministry/industry programs which will help them:

- \* reduce, reuse and recycle solid waste;
- \* effectively remediate historic pollution and destroy hazardous contaminants;
- \* reduce or eliminate liquid effluent and gaseous emissions;
- \* use energy and water more efficiently.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

## **FOR FURTHER INFORMATION, PLEASE CONTACT**

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## **MINISTRY OF ENVIRONMENT AND ENERGY PROGRAMS**

For information on Ministry of Environment and Energy assistance to industry, please contact the Industry Conservation Branch at (416) 327-1492, Fax (416) 327-1261

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*Renseignements en français:*

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*This project profile was prepared and published as a public service by the Ontario Ministry of Environment and Energy. Its purpose is to transfer information to Ontario companies about new environmental technologies.*

